CFAC/Roux Responses to USEPA Comments on Background Investigation SAP – Surface Water Scope
June 5, 2018

On behalf of USEPA, CDM Smith provided comments on the surface water portion of the Background Investigation Sampling and Analysis Plan (Background SAP) via e-mail correspondence on May 31, 2018. USEPA's comments are provided below in black text. USEPA/MDEQ/CFAC/Roux held a call on June 1, 2018 to discuss the initial comments with the goal of resolving these comments such that USEPA can conditionally approve the surface water sampling. Based on the outcome of discussions during the conference call, CFAC/Roux's responses to USEPA's comments are provided in blue.

As requested, CDM Smith has reviewed the draft Background Investigation SAP for the Columbia Falls Superfund Site. We have a number of concerns with the data quality objectives (DQOs), proposed statistical evaluation approach, and the identified reference areas for soil. However, in light of the time-critical need to collect background surface water under high flow conditions (which is occurring right now), we recommend EPA provide conditional approval of only the surface water sample collection effort at this time. This will allow for the collection of these time-critical high flow water samples, while still allowing for continued discussion and resolution of other comments on the SAP that are less time critical in nature. In that regard, while we agree with the proposed surface water background areas, the following comments specific to the high-flow surface water sampling effort are provided:

1. Figure 6 includes two different areas identified as background locations similar to Cedar Creek (i.e., a location in the headwaters of Cedar Creek and a location in Trumbull Creek). The text does not discuss the location in Trumbull Creek. Please clarify why there are two background locations identified and if both locations will be sampled.

   Cedar Creek north of the Cedar Creek Reservoir and Trumbell Creek west of the Site were initially identified during preparation of the Background SAP as potential surface water reference areas. Both areas were evaluated during reconnaissance in May 2018 and it was determined that the reference area in the headwaters of Cedar Creek is preferred due to the size, flow, and vegetation characteristics appearing most similar to the reach of Cedar Creek that traverses the Site. Cedar Creek north of the Cedar Creek Reservoir is also accessible alongside the majority of Route 486 and on National Forest land, whereas much of Trumbell Creek is located within private residential and commercial property. The Site reconnaissance section of the draft Background SAP text (Section 4.2.1) will be revised to include a brief discussion of both reference areas, as well as a discussion of CFAC/Roux's rationale for selecting Cedar Creek. Figure 6 will be revised to remove the Trumbell Creek reference area.

2. Section 2.3 – The DQOs specify that 10 samples will be collected for each reference area, but there is no rationale provided as to how this target sample size was determined. Please provide additional information to support the assertion that 10 samples will be adequate to meet the specified tolerable decision error limits identified in the DQOs. In addition, the text should provide the variability assumption under which this sample size determination was based (i.e., what was the underlying assumption of the coefficient of variation?).

   The sample size was determined in accordance with the USEPA Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites (USEPA, 2002) for one-sided two-sample hypothesis tests with confidence level 90% (α = 0.10). The power of the test was selected to be 90% (β = 0.10) at the relative difference of 1.5. The relative difference is the ratio of the minimum detectable difference (MDD, i.e. the gray region) to the natural variability (standard deviation, σ). The value of 1.5 falls within the USEPA-recommended range of 1 to 3 (USEPA, 2002), and yields an approximate minimum sample size of seven (7) samples from the ProUCL DQOs Based Sample Sizes tool. This value was rounded up to ten (10) samples to be conservative and to ensure sufficient data are available to calculate reasonably reliable estimates of BTVs and

UCL_{mean} concentrations. A minimum sample size of ten corresponds to a relative difference less than 1.2 as determined by the ProUCL tool.

Based on the existing Phase I surface water dataset, a coefficient of variation ranging from 20% to 200% is expected. The coefficient of variation is different for each COPC, but on average was found to be 40%. These estimates are expected to be the upper bounds of the coefficients of variation since the background reference areas should have COPC concentrations less than or equal to the locations sampled during the Phase I.

If a hypothesis test is deemed inconclusive at the target levels of power and confidence for specific COPCs, additional analyses will be conducted for those COPCs. This may include combining background reference areas to increase the background sample size and, in turn, the power of the analysis if two-sided hypothesis testing shows them to be equivalent and comparable with respect to that COPC. The additional analyses may also include point by point comparisons to a BTV that would be determined in accordance with ProUCL guidance.

Based on the above described approach, CFAC/Roux believes the sample size is adequate for a Background Test Form 1. As per the risk assessment work plans, the background analysis will not be used to eliminate COPCs from the risk assessment, but rather to better frame the outcome of the risk assessment and assess whether and to what extent background conditions may be contributing to the overall risk at the Site. If a COPC falls within the gray region, the COPC will undergo point by point comparisons to a BTV as a conservative approach to identify all onsite areas where the COPC are possibly related to onsite operations.

3. Section 4.2.3 – This section provides no discussion of how or where the 10 surface water samples will be collected for each background area (e.g., will 10 samples be collected at 10 different locations in the area? Will all 10 samples/area be collected contemporaneously, or distributed between high and low water events?). Please clarify the sampling approach.

Two rounds of background surface water sampling will occur; one round during high water season in June 2018, and one round during low water season in October/November 2018 to evaluate temporal variability. Ten background samples will be collected during each round in each surface water reference area (10 in upgradient Flathead River during high-water season; 10 in headwaters of Cedar Creek during high-water season; 10 in upgradient Flathead River during low-water season; 10 in headwaters of Cedar Creek during low-water season), for a total of 40 surface water samples.

Background surface water and sediment sampling events correspond to the same timeframe as the onsite surface water and sediment sampling events specified within the Phase II SAP.

To the extent possible, the surface water and associated sediment samples will be collected from 10 different locations throughout each background reference area. As discussed in the Flathead River Reference Area Selection section (Section 3.4), the high-flow and rocky substrate of the Flathead River limit the areas in which sediment deposition occurs and, in turn, the numbers of areas available for collection of sediment samples. Therefore, sediment sample locations will be collected from the same locations as surface water samples when possible. If sediment is not present at a surface water location, sediment will be collected from the nearest identifiable depositional area. If ten separate and distinct sediment depositional areas are not identified within the reference area, multiple sediment samples may be collected from some areas of observed deposition.

Surface water and associated sediment locations in each reference area will be randomly generated in GIS to achieve a probabilistic sampling design. GIS utilizes a tool identified as "Create Random Points" which randomly places a specified number of points within an extent window or inside the features of a polygon, or along the length of line feature (i.e., such as reach of a stream or river).

This rationale is described in the DQOs (Section 2.3 and 2.7). Section 4.2.3 will be revised to include this rationale in the sampling approach.

4. Section 4.2.3 – This section does not discuss the fact that sampling will require the collection of a sample for both total recoverable and dissolved metals analysis. Please clarify the sample collection methods.

   Section 4.4 (Laboratory Analytical Methods) describes that surface water samples will be analyzed for total target analyte list (TAL) metals via USEPA Methods 6020A / 7470A; and dissolved TAL metals via USEPA Methods 6020A / 7470A. Section 4.2.3 will be revised to reference the list of analytical parameters in Section 4.4.

5. Section 4.4 – The DQOs provide no discussion or rationale as to why the proposed water quality parameters (as listed in Section 4.4) are being collected. It is assumed hardness data is being collected to allow for better interpretation of hardness-dependent metals toxicity and the other water quality parameters are being collected to ensure comparability of background locations to site conditions. Please provide the necessary rationale to support the collection of water quality data.

   DQO Sections 2.1 (Define the Problem) and 2.3 (Identify Information Inputs) discuss that the results of the Phase I Site Characterization indicated that cyanide, fluoride, and PAHs are the primary COPCs found within the Site, and metals were detected frequently across the Site in most soil, surface water, and sediment samples. Developing an understanding of the occurrence and concentrations of these COPCs in background reference areas will be necessary to frame the results of the risk assessment with respect to these COPCs.

   Although the results of the Phase I determined that that cyanide, fluoride, PAHs, and select metals were considered primary COPCs at the Site, background surface water samples will be analyzed for full suites of SVOCs and metals, as it is not yet known whether additional SVOCs or metals may be identified as COPCs within the Site as part of the Phase II.

   In addition to the analysis of potential COPCs, additional general chemistry parameters (as listed in Section 4.4) as are also being collected. The rationale for the additional general chemistry parameters is provided below. DQO Section 2.3 will be revised provide the rationale for the additional parameters.

   - Hardness - Chronic surface water quality criteria for many metals are based on exposure to the dissolved phase and are a function of surface water hardness (as mg/L $CaCO3$).
   - Surface water biotic ligand model (BLM) parameters: Ancillary parameters to support the evaluation of the BLM for copper (temperature, pH, dissolved organic carbon [DOC], calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity) were collected in the final round of four surface water sampling events conducted as part of the Phase I Site Characterization. Exposure characterization for copper in surface water in the BERA will include analyses of the necessary ancillary parameters to support the evaluation of the BLM.
   - Organic carbon content: Influences the partitioning and bioavailability of metals and organic COPECs in soil and sediment.
   - Fate and transport analytes including grain size distribution (sieve and hydrometer), moisture content, total organic carbon, and bulk density, will be analyzed on sediment samples to support future fate and transport assessment and modeling efforts, if necessary as part of the RI/FS.